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R. R. Silen, Geneticist, Willamette Res.Center July 6, 1956

K. H. Wright, Entomologist

RX-NW COOPERATION, Federal Agencies, Chermes on fir in the Wind River Arboretum.

Following the group examination of the Wind River Arboretum on June 12, Bob Furniss requested that I determine in detail the aphid situation on the true firs. This was done on June 20. A summary of my detailed observations is attached.

As your party found on June 12, some species of fir are being seriously damaged by Chermes. Of 19 species of Abies examined, Chermes was found on the following 5:

A. lasiocarpa	- Subalpine fir
A. lasiocarpa var. arizonica	- Corkbark fir
A. fraseri	- Fraser fir
A. balsamea	- Balsam fir
A. alba	- Silver fir

Most of the Fraser fir are either dead or nearly so; several of the subalpine fir have suffered heavy branch kill and currently show much dying foliage. Very light infestations and minor damage was found on the other 3 infested species. It is perplexing why such species as grand fir, Pacific silver fir and noble fir have not been attacked, since aggressive infestations on these species currently exist in various parts of the Region.

Bob Furniss stated that you would look to us for analysis of the Chermes situation, and for control recommendations. We consider the infestation as a serious threat to the entire planting of Abies in the Arboretum. All the A. fraseri and most of the A. lasiocarpa appear to be damaged beyond recovery, even if sprayed immediately. The silver fir is significantly infested, but probably can be saved by spraying. The corkbark and balsam firs are lightly infested and are in no immediate danger, but should be sprayed as a precautionary measure. Although no Chermes were found on the other 14 species, chances are good that they are infested to some degree, and hence that they may be a source of reinfestation, if they are not sprayed.

2-R.R. Silen, Geneticist, 7/6/56

Before any spraying program is undertaken it is well to consider the magnitude of the job and what it will accomplish. First of all, it is quite likely that spraying will be needed annually for an indefinite period, possibly for many years. Second, the job already is a large one, if all the species of fir are sprayed, as they should be; the size of the job will increase as the trees grow. Third, spraying probably will save the trees as specimens, but it will not make it possible to determine whether any of the firs are resistant to Chermes.

Although insects have developed this year beyond the point where they are most susceptible to insecticides, it is believed that fair to good kill can yet be obtained. A water emulsion spray of Malathion or nicotine sulfate should give best results. If only the 5 tree species now known to be infested were treated, the job could be done with a back-pack sprayer-working from the ground and from ladders. Possibly Frosty Deffenbacher at the nursery has this type equipment. It seems likely that two men could treat the trees in one day, using one back-pack type sprayer. Repeat spraying possibly would be needed early this fall.

If you decide that you want to spray part or all the plantation, we will be glad to help get the project underway. About all there would be to it is to purchase and mix some insecticide, determine the dosage and go to work. If treatment is undertaken it should be done as soon as possible; the insects will become increasingly less susceptible to the spray. Please advise us as soon as possible of your decision.

cc: Director
Worthington

Attachment

KHLW-BAP

BALSAM WOOLLY APHID SITUATION ON TRUE FIRS IN THE WIND RIVER ARBORETUM - June 20, 1956

Exam. by: K. H. Wright

SPECIES		General Condition of Trees	Chermes Damage	Miscellaneous Observations
Common Name	Scientific Name			
Subalpine fir	Abies Lasiocarpa	Very poor. Bulk of trees dead or dying	Heavy Top and branch killing. Much gouting on br. tips.	Many Chermes-killed branches now bright red
Pacific Silver fir	A. amabilis	Good	None	Misc. aphids of unknown species feeding on new growth (Cinara sp.?)
Noble Fir	A. nobilis	Fair. Some off-color br. and dead '56 growth.	None	Frost believed to have killed some 1956 growth
Grand Fir	A. grandis	Very good.	None	
Balsam Fir	A. balsamea	Fair	A few small gouts on branches	These trees immed. adjacent to infested A. Lasiocarpa
Sakhalin Fir	A. Sachalinensis	Fair	None	Some frost kill of 1956 growth
White Fir	A. Concolor	Very Good		
Nikko Fir	A. homolepsis	Fair	None	
Fraser Fir	A. fraseri	Very Poor	Heavy top kill. Very heavy gouting	Chermes heavy on underside of branches. Live specimens coll.
California Red Fir	A. magnifica	Very good	None	
Korean Fir	A. Koreana	Poor	None	Poor condition due to other causes.
Maries Fir	A. mariesi	Good	None	
Siberian Fir	A. Sibirica	Poor. Most trees dead	None	
Khingan Fir	A. nephrolepsis	Fair, very slow grown	None	Found 1 6th-instar spruce budworm on foliage

SPECIES		General Condition of Trees	Chermes Damage	Miscellaneous Observations
Common	Scientific Name			
Corkbark fir	A. Lasiocarpa var. arizonica	Fair. Yellowish color; some branch-killing	Possible. A few live Chermes on bole.	Chermes suspected. Some frost kill of current growth.
Veitch fir	A. veitchi	Fair. Some yellowing of foliage.	None	
Silver fir	A. alba	Fair to good. Yellowish color.	No damage, but numerous Chermes on bole. None on branches.	Infestation heavy enough to kill most Abies. Possibly resistant species.
Faber Fir	A. fabri	Almost dead	None	
Shasta Red Fir	A. magnifica var. shastensis	Very good	None	

MISCELLANEOUS OBSERVATIONS ON INFESTED TREES

1. On Abies fraseri (Fraser fir)

   On the underside of a 1-1/4 inch diameter branch found several adult Chermes beginning to lay eggs (from 2 to 5 by each adult). Adults are well covered with wax. Also noted one egg just hatched; nymph wandering about. Spider mites and an orange-colored scale also abundant. Branch gouting very heavy on these trees. (Black and white photos taken).

2. On A. lasiocarpa (subalpine fir)

   Undersides of green branches near the bole heavily infested with adults laying eggs. As many as 25 eggs from one adult noted. A few eggs have hatched; nymphs beginning to wander.

   On ends of small gouted twigs and branchlets found many Chermes feeding under bark scales and in axils of needles. These forms appeared to be second-instar hiemosistens. Some were dead and some alive. Most specimens have secreted only a small amount of wax. This form feeding on terminal buds is probably different than the bole-inhabiting one that produces eggs. These trees would be good for frequent study to work out life stages of the insect. Trees photographed.

3. On A. alba (silver fir)

   Bole and underside of limbs very heavily infested with live first-instar, second-instar and adult hiemosistens. Eggs being deposited in large numbers. Population heavier than on A. lasiocarpa, yet little or no damage to the trees. Trees have a somewhat off-color appearance which may or may not be due to Chermes.

4. On A. lasiocarpa var. arizonica (corkbark fir)

   Chermes specimens very scarce. Those found are in adult stage and laying large numbers of eggs. No visible effect on trees.

5. On A. balsamea (balsam fir)

   Live specimens very scarce, evidence of past infestation somewhat more abundant. Little or no effect on the trees.